D-E451/E455/E456CK/E459CK

SERVICE MANUAL

US Model

Ver 1.0 1999.06

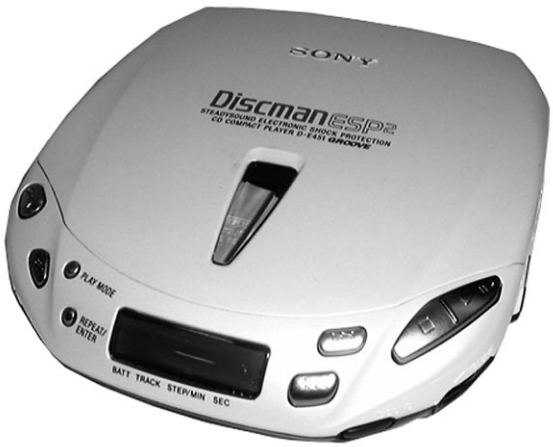

Photo : D-E451

Model Name Using Similar Mechanism	D-E441
CD Mechanism Type	CDM-2811EAA
Optical Pick-up Type	DAX-11E

SPECIFICATIONS

CD player

System
Compact disc digital audio system
Laser diode properties
Material: GaAIAs
Wavelength : λ= 780 nm
Emission duration: Continuous
Laser output : Less than 44.6 µW (This output is the value measured at a distance of 200 mm from the objective lens surface on the optical pick-up block with 7 mm aperture.)
Error correction
Sony Super Strategy Cross Interleave Reed Solomon Code
D-A conversion
1-bit quartz time-axis control
Frequency response
20 - 20,000 Hz $^{+1}_{-2}$ dB (measured by EIAJ CP-307)
Output (at 4.5 V input level)
Headphones (stereo minijack)
15 mW + 15 mW at 16 ohms
Line output (stereo minijack)
Output level 0.7 V rms at 47 kilohms
Recommended load impedance over 10 kilohms

General

Power requirements
For the area code of the model you purchased, check the upper left side of the bar code on the package.
- Sony BP-DM10 Rechargeable battery: 2.4 V DC, Ni-Cd, 650 mAh
  Sony BP-DM20 Rechargeable battery: 2.4 V DC, Ni-MH, 1,200 mAh
- Two LR6 (size AA) batteries: 3 V DC
- AC power adaptor (DC IN 4.5 V jack): US model: 120 V, 60 Hz
- Sony DCC-E245 car battery cord for use on car battery : 4.5V DC

Dimensions (w/h/d) (without projecting parts and controls)
Approx. 129 x 28 x 146 mm
(5 1/8 x 1 1/8 x 5 3/4 in.)
Mass (without rechargeable battery)
Approx. 220 g (7.8 oz)
Operating temperature
5°C - 35°C (41°F - 95°F)

Supplied accessories

For the area code of the model you purchased, check the upper left side of the bar code on the package.
D-E451
AC power adaptor (1)
Headphones (1)
D-E455
AC power adaptor (1)
Headphones with remote control (1)
Rechargeable battery (1)
D-E456CK
AC power adaptor (1)
Headphones (1)
Car battery cord (1)
Car connecting pack (1)
Velcro tape (2)
Spare fuse (1)
Spiral tube (1)
D-E459CK
AC power adaptor (1)
Rechargeable battery (1)
Headphones with remote control (1)
Car battery cord (1)
Car connecting pack (1)
Velcro tape (2)
Spare fuse (1)
Spiral tube (1)

Design and specifications are subject to change without notice.

COMPACT DISC COMPACT PLAYER

MICROFILM

SONY®

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DANGER
Invisible laser radiation when open and interlock failed or defeated.
Avoid direct exposure to beam.

CAUTION
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Flexible Circuit Board Repairing
- Keep the temperature of the soldering iron around 270°C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

Notes on chip component replacement
- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION.
REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SECTION 1
SERVICING NOTES

NOTES ON HANDLINGTHE OPTICALPICK-UPBLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body. During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.

NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe from more than 30cm away from the objective lens.

Before Replacing the Optical pick-up Block

Please be sure to check thoroughly the parameters as per the "Optical pick-up Block Checking Procedure" (Part No. : 9-960-027-11) issued separately before replacing the optical Pick-up block.
Note and specifications required to check are given below.

- FOK output : IC501 ⑫ pin
  When checking FOK, remove the lead wire to disc motor.
- S curve P-to-P value : 0.9 – 1.5Vp-p IC501 ㉛ pin. (Connect pin ⑫ of IC501 (TP880) and ③ of IC501 (GND) with a jumper wire).
  When checking S curve P-to-P value, remove the lead wire to disc motor.
- Adjusted part for focus gain adjustment : RV503
- RF signal P-to-P value : 0.8 – 1.2Vp-p
- Traverse signal P-to-P value : 1.0 – 2.4Vp-p
- The repairing grating holder is impossible.
- Adjusted part for tracking gain adjustment : RV502

Laser Diode Checking Methods

During normal operation of the equipment, emission of the laser diode is prohibited unless the upper panel is closed while turning ON the S801 (push switch type).
The following two checking methods for the laser diode are operable.

Method-1 (In the service mode or normal operation) : Emission of the laser diode is visually checked.

1. Open the upper lid.
2. Push the S801 as shown in Fig. 1-1 .
3. Check the object lens for confirming normal emission of the laser diode. If not emitting, there is a trouble in the automatic power control circuit or the optical pick-up. During normal operation, the laser diode is turned ON about 2.5 seconds for focus searching.

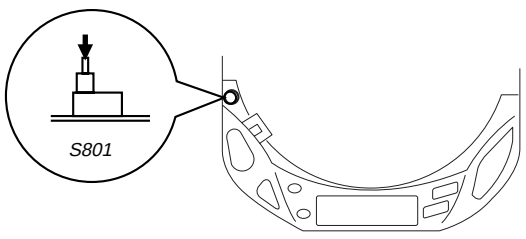
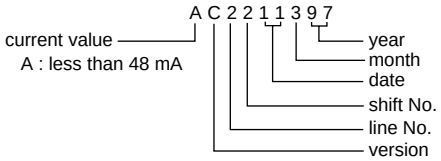


Fig.1-1 Method to push S801

Method-2 (In the service mode or normal operation) : Check the value of current flowing in the laser diode.

1. Remove the upper panel.
2. Read the current printed on the rear side of the optical pick-up. (Print on the rear side of the optical pick-up)
3. Connect a level meter as shown in Fig. 1-2
4. Press the ►II key.



5. Calculate the current value by the reading of the digital voltmeter.
   Reading of the tester (V) ÷ 4.7 (Ω) = current value (A)
   (Example) Reading of the digital voltmeter of 0.2256 V :
   0.2256 V ÷ 4.7 Ω = 0.048 (A) = 48 mA
6. Check that the current value is within the following range.
   - Current value of the label $^{+5}_{-11}$ mA(25°C)
     Variation by temperature : 0.4mA / °C
     Current increases with temperature increased.
     Current decreases with temperature decreased.

   If the current is more than the range above, there is a trouble in the automatic power control circuit or the laser diode is in deterioration.
   If less than the range, a trouble exists in the automatic power control circuit or the optical pick-up.

[MAIN BOARD] (Side B)

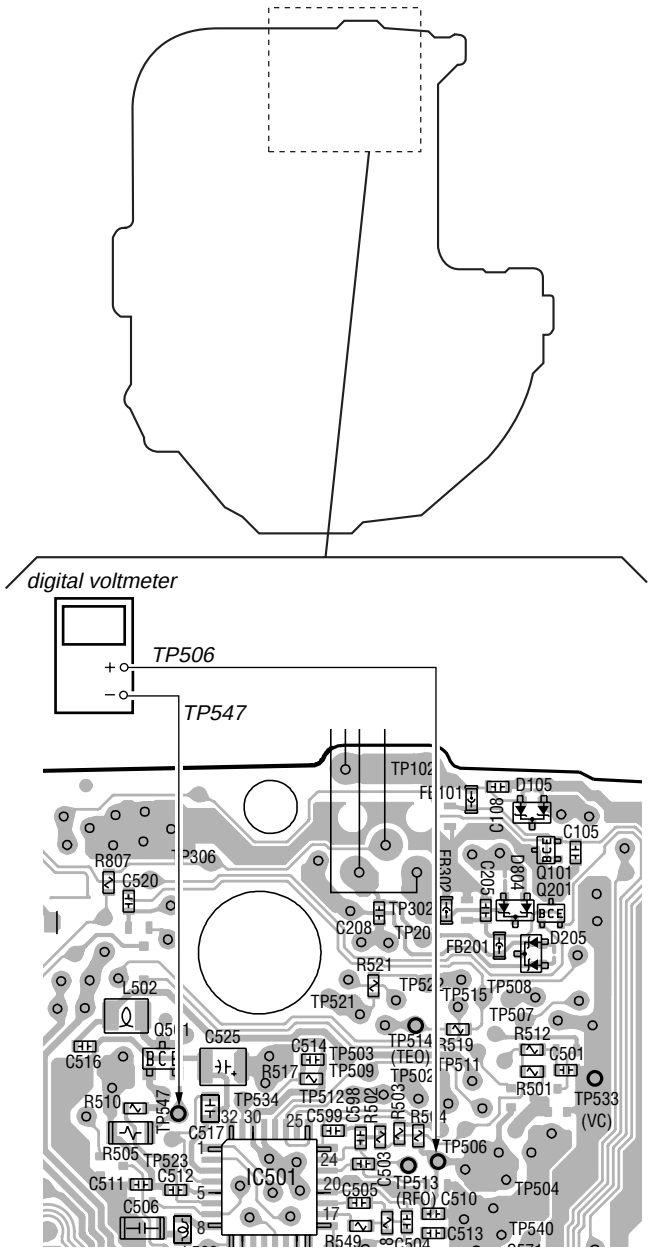
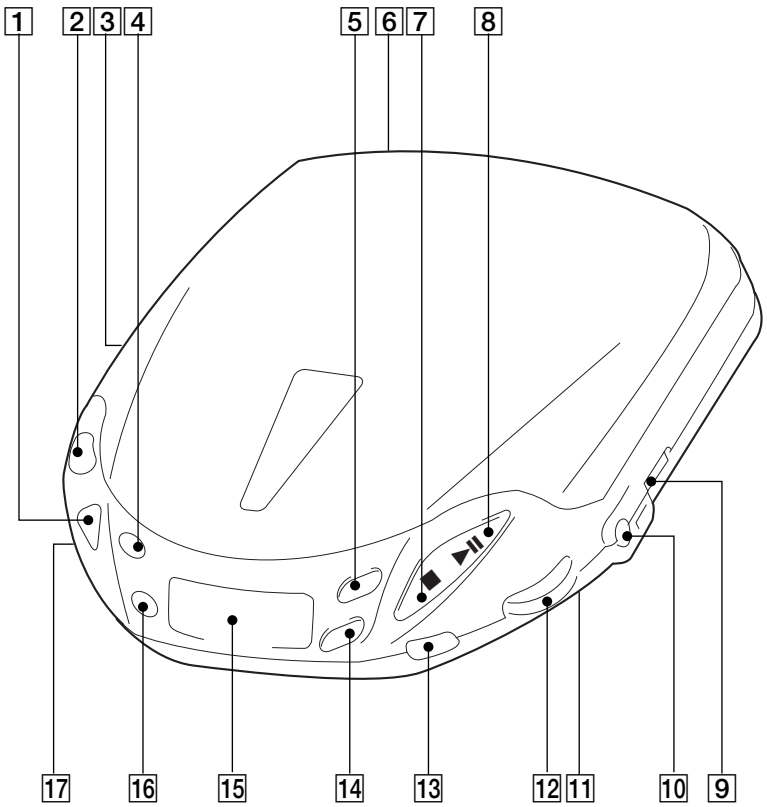


Fig. 1-2 Digital Voltmeter Connecting Location

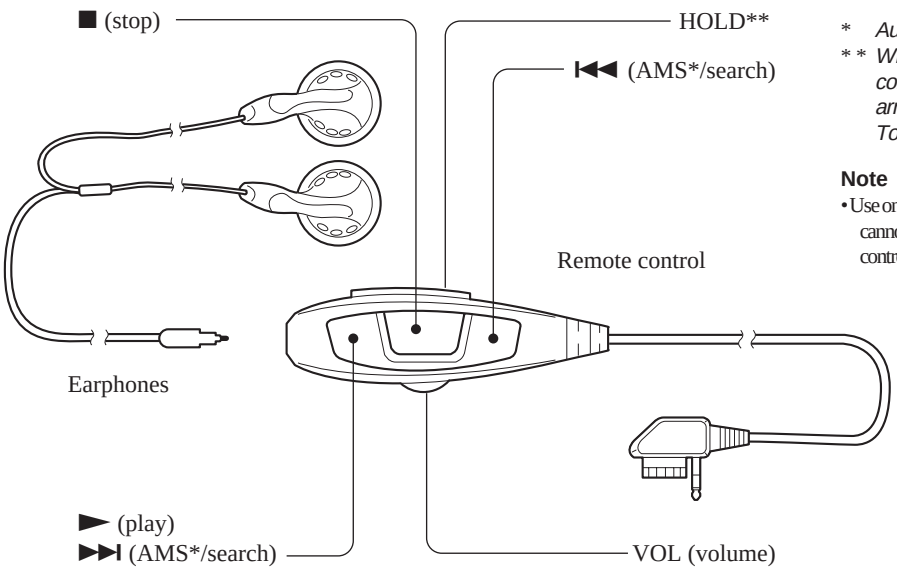
SECTION 2
GENERAL

LOCATION AND FUNCTION OF CONTROLS



1	ESP (Electronic Shock Protection) button	10	∩ /REMOTE jack
2	OPEN button	11	AVLS switch
3	DC IN 4.5V jack	12	◢ VOLUME control
4	PLAY MODE button	13	SOUND button
5	▶▶I FF button	14	I◀◀ FR button
6	LINE OUT jack	15	Information display panel
7	■ STOP button	16	REPEAT/ENTER button
8	▶II Play/pause button	17	HOLD switch
9	OFF-RESUME-ON switch		

Remote control : (D-E455/E459CK)



* *Automatic Music Sensor*

* * *When you are not using the remote control, slide HOLD in the direction of the arrow to prevent any accidental operation. To unlock, slide HOLD back.*

Note

• Use only the supplied remote control. You cannot operate this player with the remote control supplied with other models.

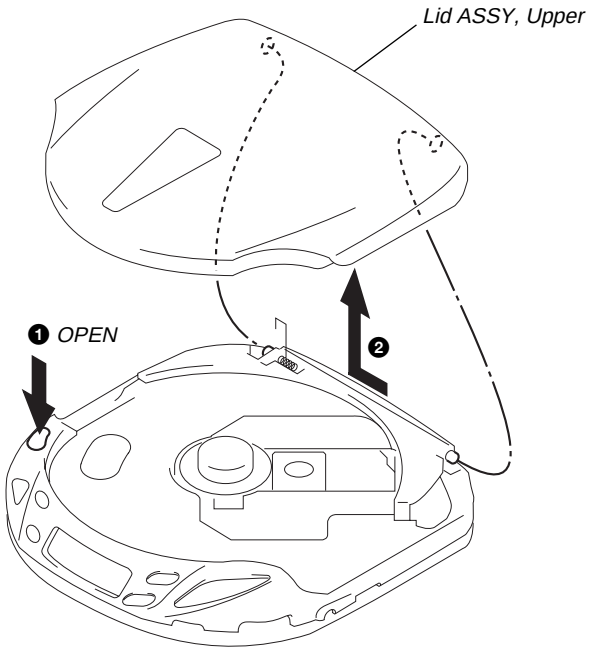
SECTION 3
DISASSEMBLY

● The equipment can be removed using the following procedure.

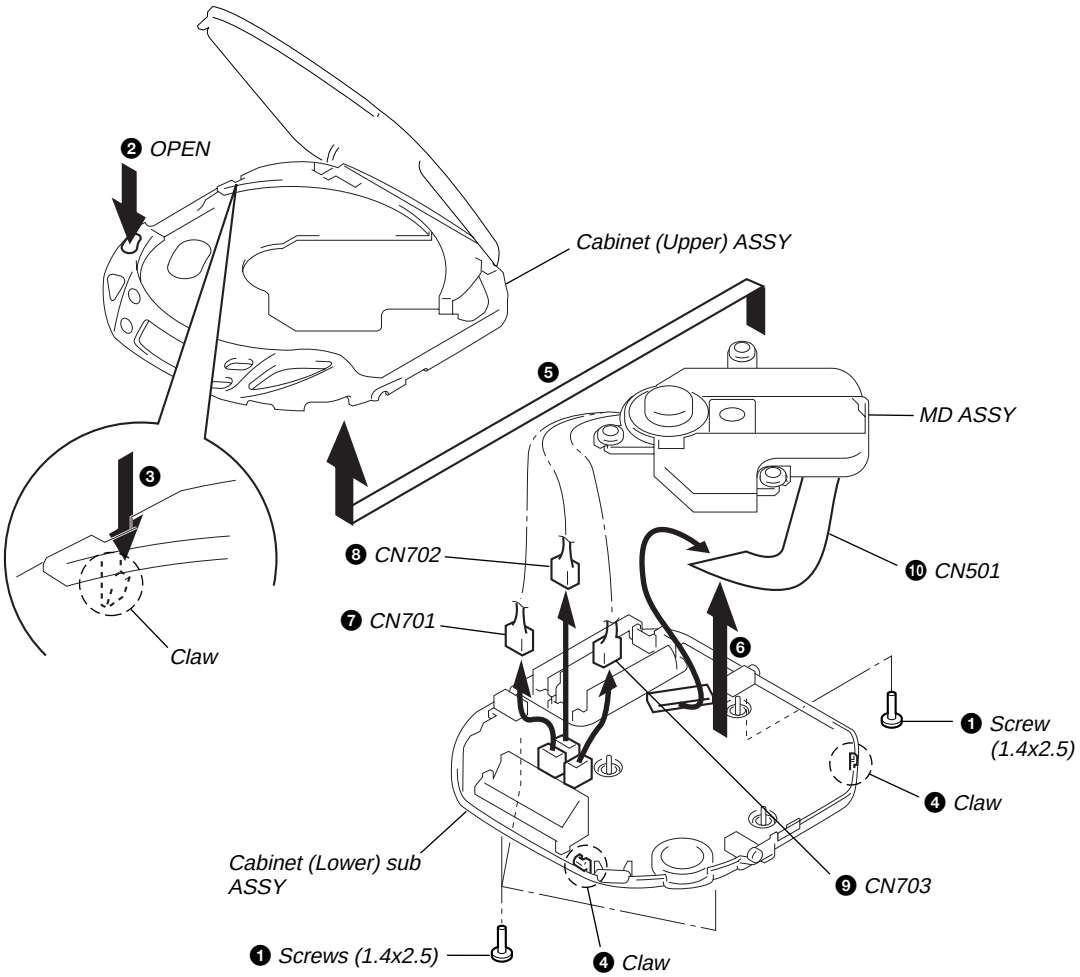
Set → Lid ASSY, Upper
Set → Cabinet (Upper) ASSY, Cabinet (Lower) sub ASSY, MD ASSY → Main board, LED sub board (E456CK, E459CK)
Set → Cabinet (Upper) ASSY, Cabinet (Lower) sub ASSY, MD ASSY → Turn table motor ASSY (Spindle) (M902), Optical pick-up (DAX-11E), Sled motor ASSY (M901)

Note : Follow the disassembly procedure in the numerical order given.

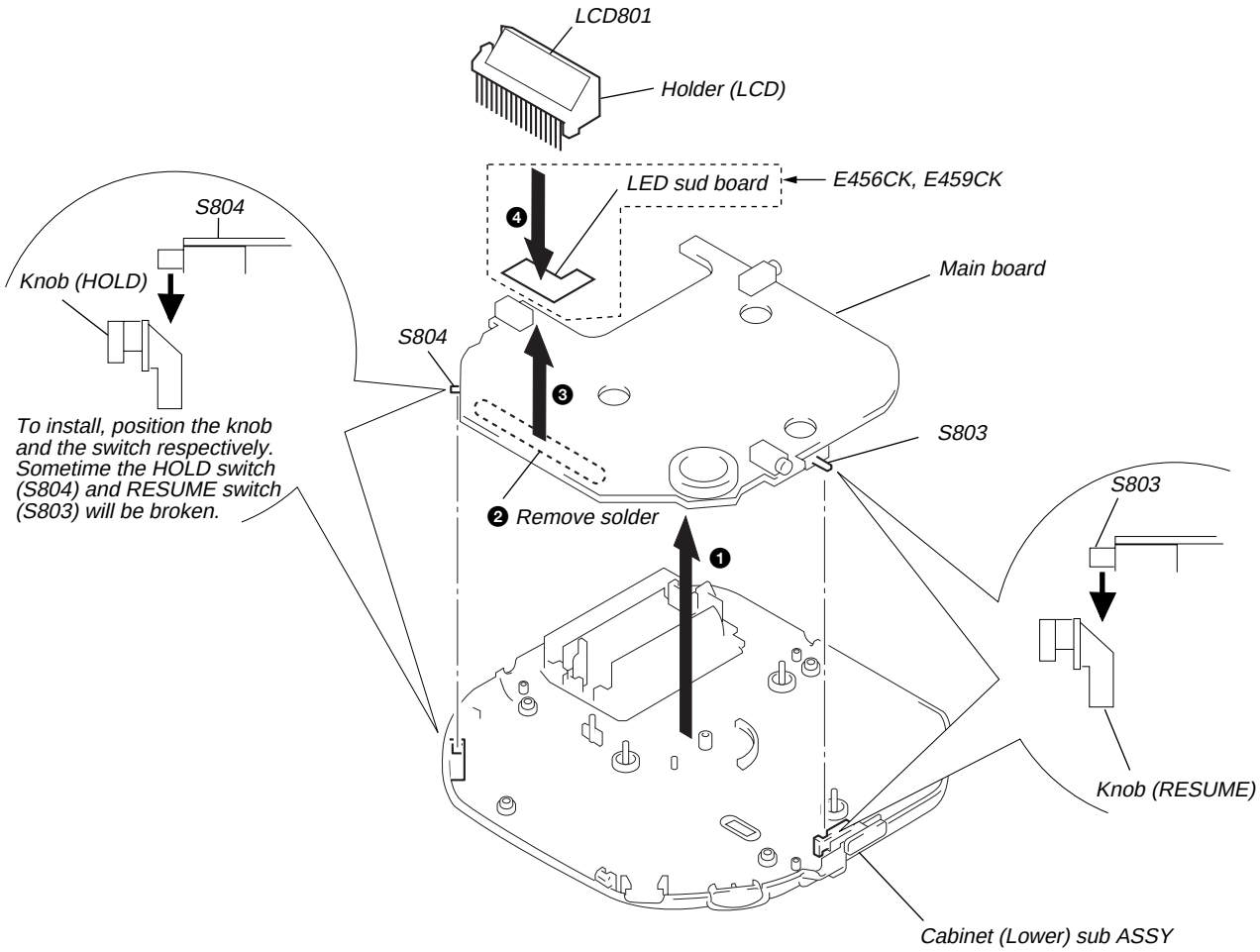
3-1. LID ASSY, UPPER



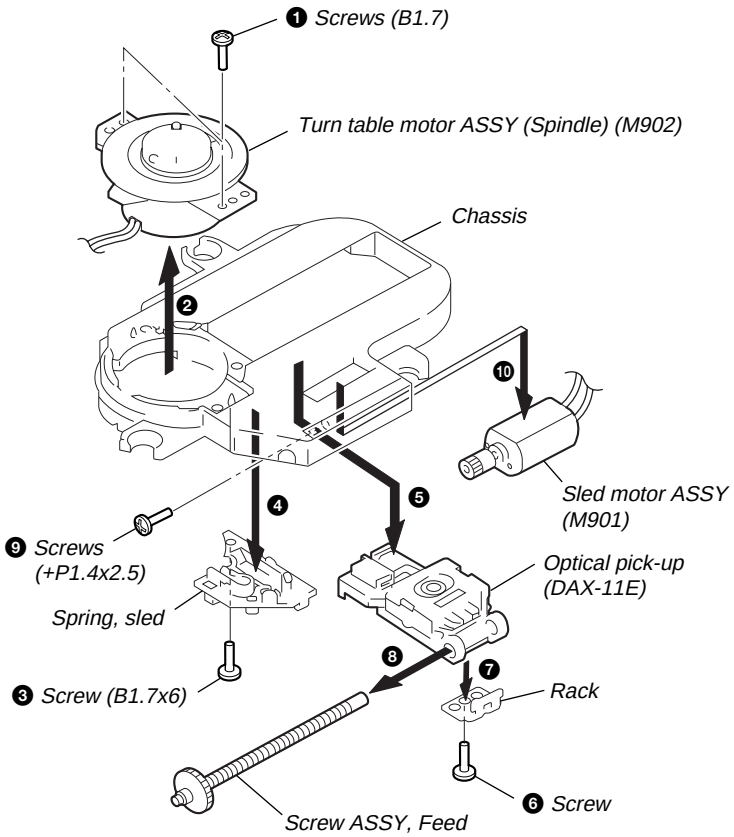
3-2. CABINET (UPPER) ASSY, CABINET (LOWER) SUB ASSY, MD ASSY



3-3. MAIN BOARD, LED SUB BOARD (E456CK, E459CK)



3-4. TURN TABLE MOTOR ASSY (SPINDLE) (M902), OPTICAL PICK UP (DAX-11E), SLED MOTOR ASSY (M901)



SECTION 4
SERVICE MODE

Service Mode (service program)

The equipment is provided with a service program built in the microcomputer, like conventional models.
Service program operation methods are described in the following.

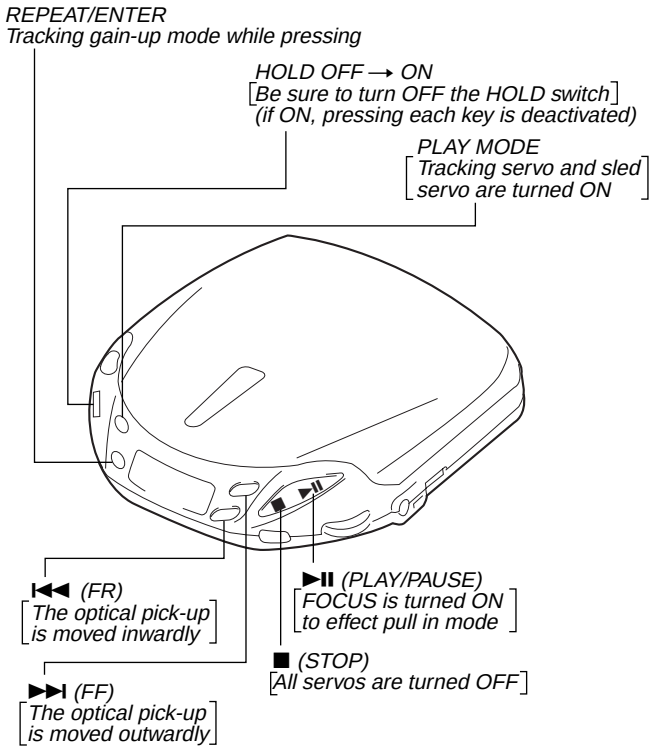

REPEAT/ENTER
Tracking gain-up mode while pressing
HOLD OFF → ON
Be sure to turn OFF the HOLD switch
(if ON, pressing each key is deactivated)
PLAY MODE
Tracking servo and sled servo are turned ON
⏮ (FR)
The optical pick-up is moved inwardly
⏯ (PLAY/PAUSE)
FOCUS is turned ON to effect pull in mode
■ (STOP)
All servos are turned OFF
⏭ (FF)
The optical pick-up is moved outwardly

Fig. 4-1 Layout of each key

• Step 1 (Service mode setting method)
1. Turn OFF the HOLD switch the external power supply disconnected (power is not applied to the set).
2. Solder across the T802 (TEST) terminals (pin ㊿, IC801 (TEST) is grounded).
3. Connect an external power supply.
   Thus, the set is switched to the service mode.

• Step 2 (Operation in the service mode)
1. Once the service mode is effected, the LCD displays 5 indications each of which is repeatedly displayed.
   However, the following operations can be activated even if LCD indication is effected.
2. By pressing the ⏭ or ⏮ key, the optical pick-up movable inwardly or outwardly. However, if this is activated, tracking servo and sled servo are turned OFF, so it can be turned ON by pressing the PLAY MODE key, if required.
3. By pressing the REPEAT/ENTER key, the tracking gain-up mode becomes active.
4. By pressing the ⏯ key, focus is turned ON from focus searching while entering CLV-S (pull-in mode).
   Without disc, focus searching is repeated continuously.
5. By pressing the PLAY MODE key, tracking servo, sled servo and CLV-A (servo in PLAY) are turned ON.
6. When 4. and 5. are performed, playing begins. No muting is ON in the service mode.
7. By pressing the ■ key, all servos (focus tracking and sled) are turned OFF. However, the disc motor revolves for a while by inertia.

• Step 3 (Resetting service mode)
1. Be sure to disconnect the external power supply and remove the solder bridge at the TEST terminals connected in setting.
2. The set thus becomes available for normal operation.

– MAIN BOARD – (Side A)

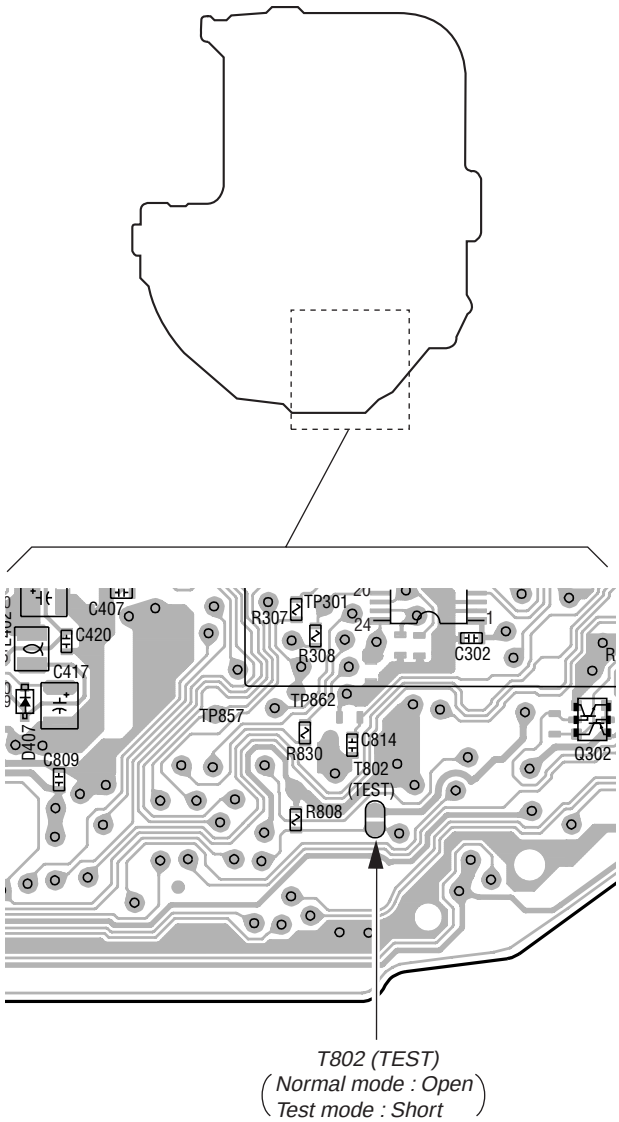


Fig. 4-2 Location of test terminal

SECTION 5
ADJUSTMENTS

CD SECTION

Precautions for Adjustment

1. Before beginning adjustment, set the equipment to service mode. After the completion of adjustment, be sure to reset the service mode.
   For more information, see “Service Mode (service program)” on page 7.
2. Perform adjustments in the order given.
3. Use the disc (YEDS-18. Part No. 3-702-101-01) unless otherwise indicated.
4. Power supply voltage requirement : DC 4.5 V
   HOLD switch : OFF
   VOLUME : Minimum
   SOUND switch : NORM
   AVLS switch : OFF

Before Beginning Adjustment

Set the equipment to service mode (See page 7) and check the following.
If there in an error, repair the equipment.

• Checking of the sled motor

1. Open the upper panel.
2. Press the ▶▶I and I◀◀ keys and check that the optical pick-up can move smoothly without sluggishness or abnormal noise in innermost periphery ⟶ outermost periphery ⟶ innermost periphery.
   ▶▶I : The optical pick-up moves outwardly
   I◀◀ : The optical pick-up moves inwardly

• Checking of focus searching

1. Open the upper panel.
2. Press the ▶II key. (Focus searching operation is activated continuously).
3. Check the object lens of the optical pick-up for smooth up/down motion without sluggishness or abnormal noise.
4. Press the ■ key.
   Check that focus searching operation is deactivated. If not, again press the ■ key slightly longer.

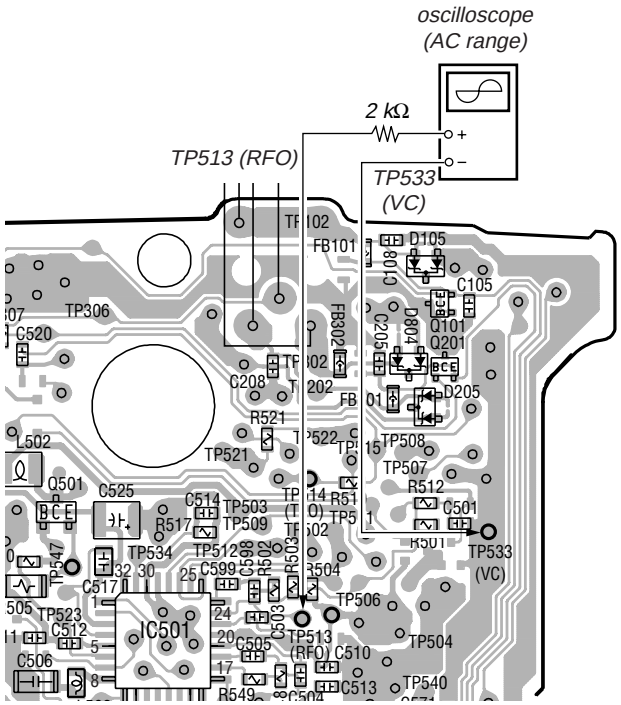
Focus Bias Check

Condition :

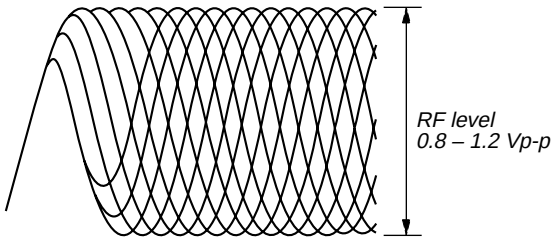
• Hold the set in horizontal state.

Procedure :

[MAIN BOARD] (Side B)



1. Set the equipment to service mode stop state (See page 7).
2. Connect the oscilloscope between TP513 (RFO) and TP533 (VC) on the MAIN board.
3. Move the optical pick-up by Pressing the ▶▶I and I◀◀ keys.
4 Put the disc (YEDS-18).
5. Press the ▶II key.
   (From focus searching, focus is turned ON while entering CLV drawing-in mode. Tracking and sled are turned OFF.)
6. Press the PLAY MODE key. (Both tracking and sled are turned ON).
7. Check the oscilloscope waveform is as shown below.
   A good eye pattern means that the diamond shape (◊) in the center of the waveform can be clearly distinguished.



• RF Signal Reference Waveform (eye pattern)
  To watch the eye pattern, set the oscilloscope to AC range and increase the vertical sensitivity of the oscilloscope for easy watching.

8. Stop removing of the motor by pressing the ■ key.
9. After the completion of adjustment, reset service mode. (See page 7)

Focus/Tracking Gain Adjustment

A servo analyzer is necessary in order to perform this adjustment exactly.

However, this gain has a margin, so even if it is slightly off, there is no problem. Therefore, do not perform this adjustment.

Focus/tracking gain determines the pick-up follow-up relative to mechanical noise and mechanical shock when the 2-axis device operate. However, as these reciprocate, the adjustment is at the point where both are satisfied.

- When gain is raised, the noise when 2-axis device operates increases.
- When gain is lowered, it is more susceptible to mechanical shock and skipping occurs more easily.

This adjustment has to be performed upon replacing any of the following parts :

- Optical pick-up
- RV503 (Focus gain)
- RV502 (Tracking gain)

Normally, be sure not to move RV503 (focus gain) and RV502 (tracking gain).

– Focus Gain Adjustment –

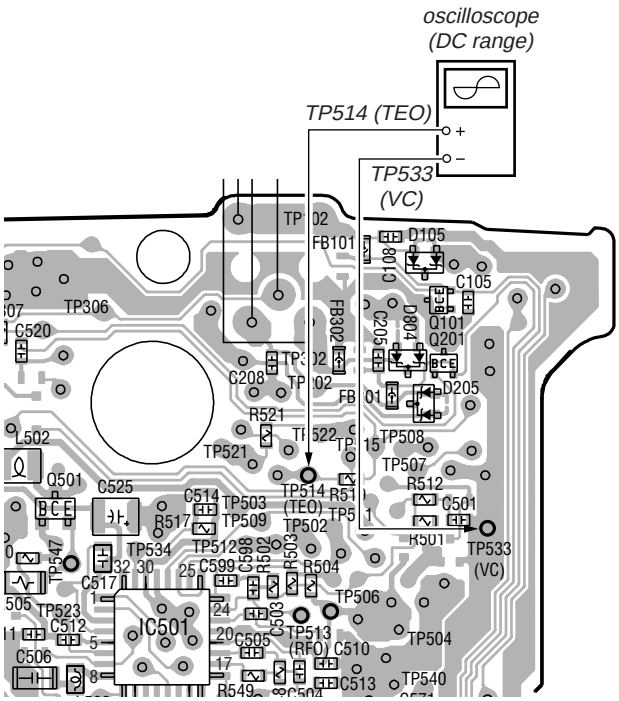
Procedure :

This adjustment is not performed. If focus gain RV503 is turned, set to mechanical center.

– Tracking Gain Adjustment –

(perform at normal operation)

[MAIN BOARD] (Side B)



1. Place the optical pick-up level, horizontally. (If the optical pick-up is not level, the 2-axis device will be weighted and adjustment cannot be done.)
2. Connect the oscilloscope between TP514 (TEO) and TP533 (VC) on the MAIN board.
3. Set the disc (YEDS-18) and Press the ▶II (▶▶I) key.
4. Turn RV502 slightly clockwise (tracking gain drops) and obtain a waveform with a fundamental wave (waveform has large waves) as in Figure 5-1 .
5. Turn RV502 slowly counterclockwise (tracking gain rises) until the fundamental wave disappears (no large waves) as in Figure 5-2.
6. Set RV502 to the position about 30 °counterclockwise from the position obtained in step 5. If RV502 contact point is more than 90 ° counterclockwise from mechanical center, tracking gain is too high. In this case, readjust from step 4.
7. Press ▶II (▶▶I) or I◀◀ keys and observe the 100 track jump waveform. Check that no traverse waveform appears for both ▶II (▶▶I) or I◀◀ directions. (See Figures 5-3 and 5-4.) It is acceptable if the traverse waveform appears only now and then, but if it appears constantly raise tracking gain slightly and check step 7 again.
8. Check that there is no abnormal amount of operation noise (white noise) from the 2-axis device. If there is, tracking gain is too high, readjust starting with step 4.

The waveforms are those measured with the oscilloscope set as shown below.

- VOLT/DIV : 50mV
- TIME/DIV : 5mS
- Waveform when tracking gain lowered.
  Fundamental wave appears (large waves).

Fig. 5-1

- Waveform when fundamental wave disappears (no large waves).

Fig. 5-2

- Waveform when no traverse waveform during 100 track jump. (Brake application is smooth because of adjustment.)

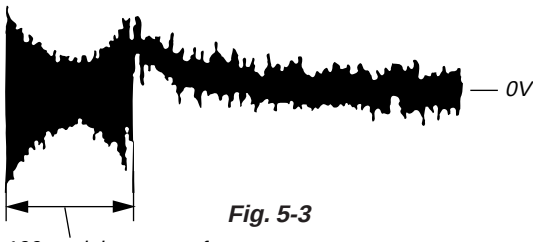


Fig. 5-3

- Waveform when no traverse waveform during 100 track jump. (Brake application is poor because of adjustment.)

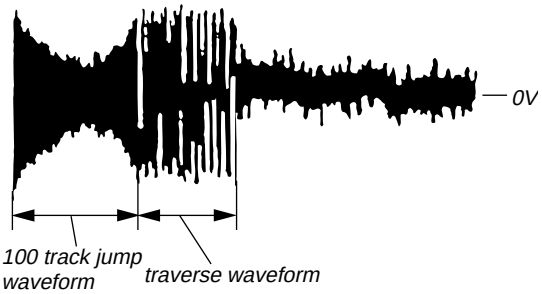
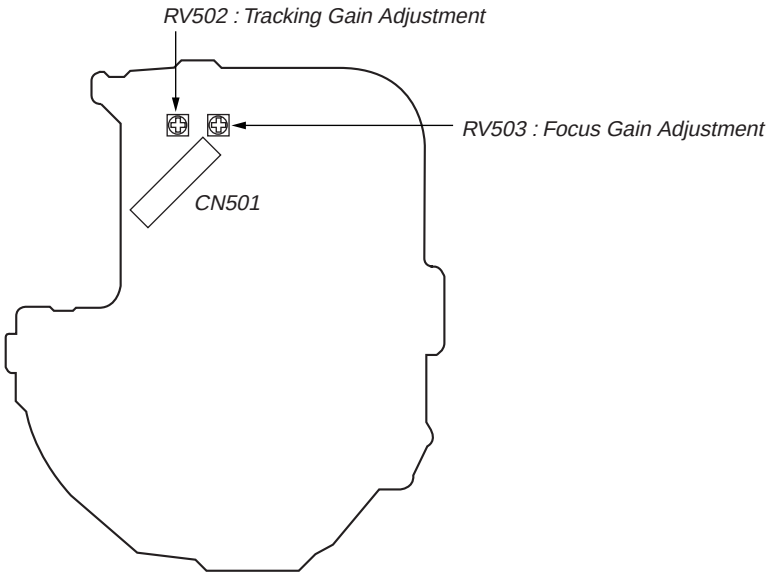


Fig. 5-4

Adjustment Location :

MAIN BOARD] (Side A)



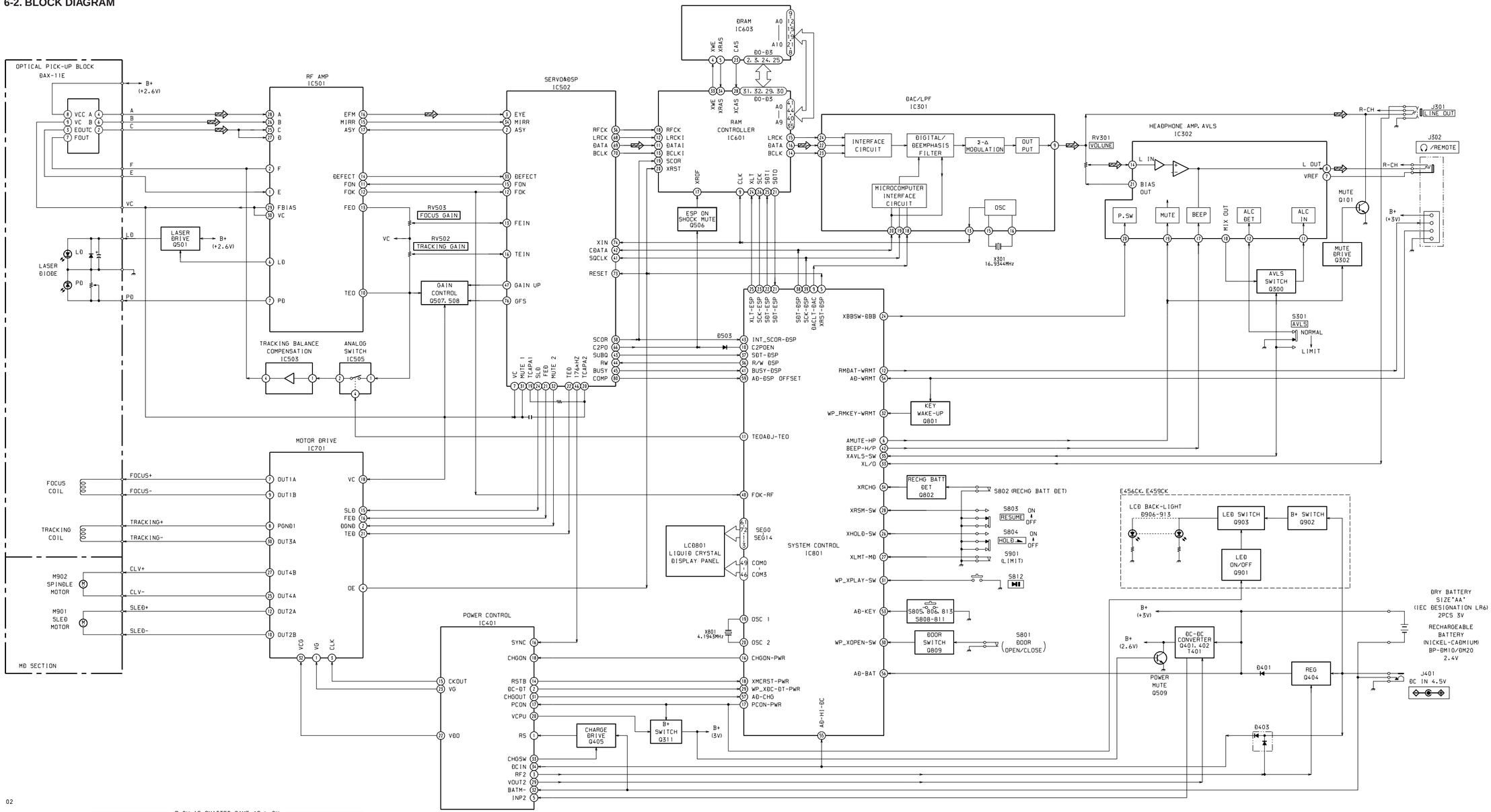
SECTION 6
DIAGRAMS

6-1. EXPLANATION OF IC TERMINALS

IC801 MC68HC05L15SC442720CPB (SYSTEM CONTROL)

Pin No.	Pin name	I/O	Description
1 – 3	SEG 12–14	O	LCD segment signal output terminal.
4	FP26	–	Not used (Open).
5	XRST– DSP	O	Reset output terminal.
6	AMUTE – HP	O	Audio mute output terminal.
7	XOE-ESP	O	ESP POWER ON control output.
8	C2PO FILTER	–	Not used (Open).
9	DACLT–DAC	I/O	CPU serial data input, latch signal output (For DAC only).
10	C2POEN	O	C2PO signal control output. “ L ” : Stop “ H ” : Searching
11	TEOADJ – TEO	O	Tracking ADJ switch control output.
12	RMDAT–WRMT	O	Serial data output to LCD remote controller.
13	VLCD (GND)	–	Connect to ground.
14	VSS (GND)	–	Connect to ground.
15	NDLY (GND)	–	Connect to ground.
16	CHGON – PWR	O	Charge ON/OFF control output.
17	PCON–PWR	O	Power ON/OFF control output. “ L ” : ON “ H ” : OFF
18	XMCRST–PWR	I	System reset input terminal.
19	OSC 1	I	System clock oscillator input terminal (4.1943 MHz).
20	OSC 2	O	System clock oscillator output terminal (4.1943 MHz).
21	SDT–ESP	I	Serial data input from ESP control (IC601).
22	SDT–ESP	O	Serial data output to ESP control (IC601).
23	SCK–ESP	O	Serial clock output to ESP control (IC601).
24	XBBSW – DBB	O	DBB switch control output.
25	XLT–ESP	O	Latch signal output to ESP control (IC601).
26	HOLD–SW	I	Hold switch input termianl. “ L ” : HOLD ON “ H ” : HOLD OFF
27	XLMT–MD	I	Limit switch input terminal. “ L ” : Inside Track
28	XRSM–SW	I	RESUME switch input terminal. “ L ” : ON “ H ” : OFF
29	WP XDC–DT PWR	I	DC in voltage detection terminal.
30	WP XOPEN–SW	I	Door open switch input terminal. “ L ” : Close “ H ” : Open
31	WP XPLAY–SW	I	Play/pause key input terminal.
32	WP RMKEY WRMT	I	Remote control key input terminal.
33	XL/O DCT	I	LINE OUT jack detection terminal. “ L ” : Present “ H ” : No
34	XRCHG–SW	I	Rechargeable battery detection terminal. “ L ” : Present “ H ” : No
35	XAVLS–SW	I	AVLS switch input terminal.
36	R/W DSP	O	Read/Write switching signal output terminal. “ L ” : Read “ H ” : Write
37	SDT–DSP	I	SUB–Q signal input terminal.
38	SDT–DSP	O	Serial data output to DSP (IC502) and D/A C (IC301).
39	SCK–DSP	O	Clock signal to enter SUB–Q signal to DSP (IC502) and D/A C (IC301).
40	FOK–RF	I	FOK signal input terminal.
41	BUSY–DSP	I	BUSY signal input terminal from DSP (IC502).
42	BEEP–H/P	O	Beep sound output terminal.
43	INT SCOR–DSP	I	Sub code sync SO+SI input terminal.
44	INT DFCT RF	I	Wireless remote control signal input.
45	VDD (VCPU)	–	Power supply terminal.

Pin No.	Pin name	I/O	Description
46 – 49	COM 3–0	O	LCD common signal output terminal.
50	VREFH	I	Reference voltage input terminal (connect to VDD).
51	VREFL	–	Connect to ground.
52	AD ESPSL/TEST	I	Test mode terminal. “ L ” : Test mode “ H ” : Nomal mode
53	AD–KEY	I	A/D input terminal for main unit key.
54	AD–WRMT	I	A/D input terminal for remote control key.
55	AD–HI DC	I	A/D input terminal for DC IN voltage detection.
56	AD – BAT	I	Rechargeable battery/dry cell detection input.
57	AD – CHGMNT	I	A/D input terminal for charging voltage monitor.
58	AD – VCC	I	A/D input terminal for VCC voltage monitor.
59	AD – DSP OFFSET	I	A/D input terminal for DSP off-set monitor.
60	FP10	–	Not used (Open).
61 – 72	SEG 0 – 11	O	LCD segment signal output terminal.



- Signal path.
  ⇨ : CD

02

6-3. PRINTED WIRING BOARDS

● **Semiconductor Location**

Ref. No.	Location	Ref. No.	Location
D101	F-11	IC503	D-14
D105	A-14	IC505	D-14
D201	F-10	IC601	C-10
D205	B-14	IC603	E-12
D302	G-10	IC701	E-14
D401	G-15	IC801	H-12
D402	H-14		
D403	G-15		
D407	H-4	Q101	A-14
D416	F-15	Q201	B-14
		Q300	F-6
D417	G-14	Q302	H-6
D503	D-12	Q311	H-12
D801	F-10		
D803	F-10	Q401	G-15
D804	B-14	Q402	G-15
		Q404	G-2
D805	F-9	Q405	G-2
D806	E-10	Q501	B-12
D807	F-8		
D906	I-9	Q506	C-11
D907	I-9	Q507	B-4
		Q508	B-3
D908	I-8	Q509	G-13
D909	I-9	Q801	F-10
D910	I-8		
D911	I-8	Q802	H-2
D912	I-7	Q809	H-2
		Q901	I-9
D913	I-7	Q902	I-9
		Q903	H-9
IC301	G-6		
IC302	F-7		
IC401	H-4		
IC501	C-13		
IC502	E-11		

Note:

- ⟷ : parts extracted from the component side.
- ○ : Through hole.
- ▨ : Pattern from the side which enables seeing.

(The other layers' patterns are not indicated.)

Caution:

Pattern face side: (Side B)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Side A)	Parts on the parts face side seen from the parts face are indicated.

[MAIN BOARD] (SIDE A)

OPTICAL PICK-UP BLOCK DAX-11E

M902 SPINDLE MOTOR

M901 SLED MOTOR

S901 (LIMIT SW)

S802 (RECHG BATT DET)

T802(TEST) NORMAL MODE:OPEN TEST MODE:SHORT

1-672-051-

[MAIN BOARD] (SIDE B)

J301 LINE OUT

DRY BATTERY SIZE "AA" (IEC DESIGNATION LR6) 2PCS, 3V

RECHAGEABLE BATTERY (NICKEL-CADMIUM) BP-DM10/DM20 2.4V

J401 DC IN 4.5V

S803 RESUME ON ↑ OFF

J302 (♪)/REMOTE

S812

RV301 VOLUME

S801 (OPEN SW)

S804 HOLD OFF→ON

S806 ESP

S805 PLAY MODE

S809 REPEAT/ ENTER

S810

S811

S813 SOUND

AVLS NORM→LIMIT

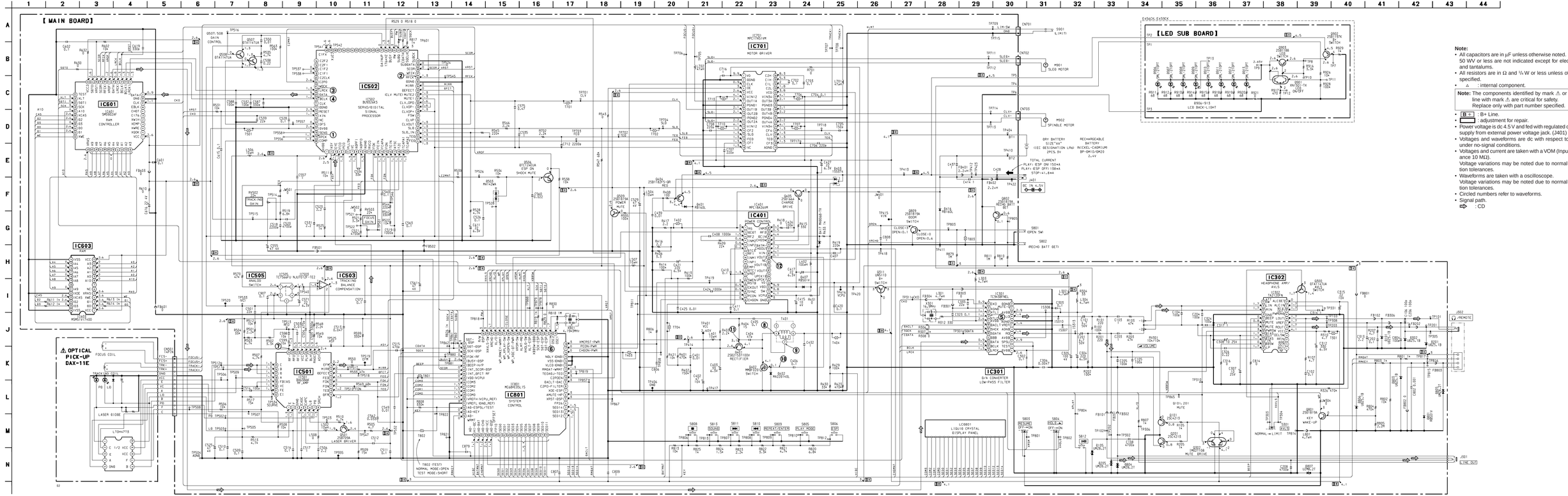
E456CK, E459CK

[LED SUB BOARD]

D906-913 (LCD BACK-LIGHT)

1-675-316-

1-672-051-



Note:

- All capacitors are in µF unless otherwise noted. pF: µµF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- △ : internal component.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- **[B-]** : B+ Line.
- : adjustment for repair.
- Power voltage is dc 4.5 V and fed with regulated dc power supply from external power voltage jack. (J401)
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
- Voltages and current are taken with a VOM (Input impedance 10 MΩ).
  Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  : CD

● Waveforms

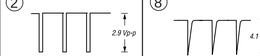
① SERVICE MODE during TRK servo OFF

IC502 ⑰ (XPCK) — VOLT/DIV : 1 V AC, TIME/DIV : 0..2 µsec

⑦ PLAY MODE

IC501 ㉒ (RFO) — VOLT/DIV : 0.2 V AC, TIME/DIV : 0.5 msec

②



IC502 ⑯ (FRCK) — VOLT/DIV : 1 V AC, TIME/DIV : 50 µsec

⑧

T401 ④ — VOLT/DIV : 1 V AC, TIME/DIV : 2 µsec

③

IC502 ⑮ (LRCK) — VOLT/DIV : 1 V AC, TIME/DIV : 10 µsec

⑨

T401 ② — VOLT/DIV : 2 V AC, TIME/DIV : 2 µsec

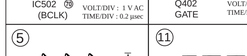
④

IC502 ⑭ (BCLK) — VOLT/DIV : 1 V AC, TIME/DIV : 0.2 µsec

⑩

Q402 GATE — VOLT/DIV : 2 V AC, TIME/DIV : 2 µsec

⑤

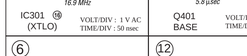


IC301 ⑬ (XTLO) — VOLT/DIV : 1 V AC, TIME/DIV : 50 nsec

⑪

Q401 BASE — VOLT/DIV : 2 V AC, TIME/DIV : 2 µsec

⑥



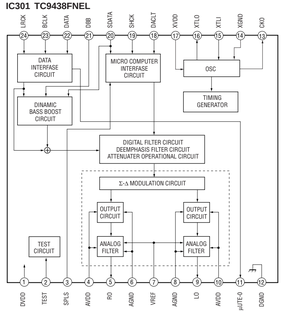
IC801 ㉘ (OSC2) — VOLT/DIV : 1 V AC, TIME/DIV : 0.2 µsec

⑫

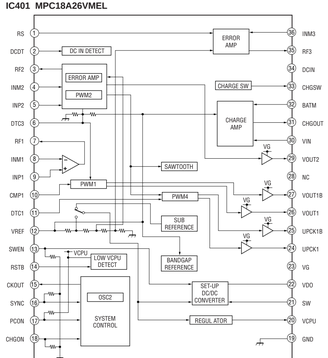
IC401 ㉙ (VOUT2) — VOLT/DIV : 2 V AC, TIME/DIV : 2 µsec

● IC Block Diagrams

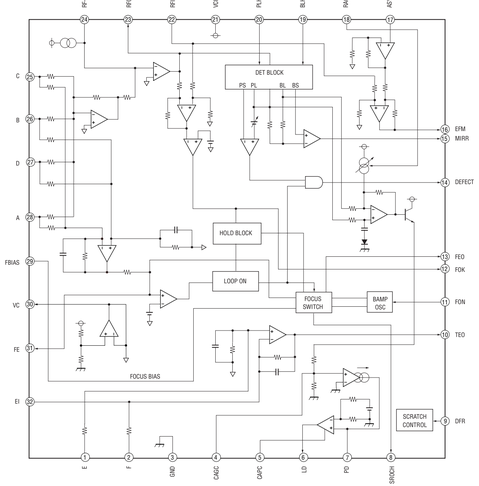
IC301 TC9438FNEL



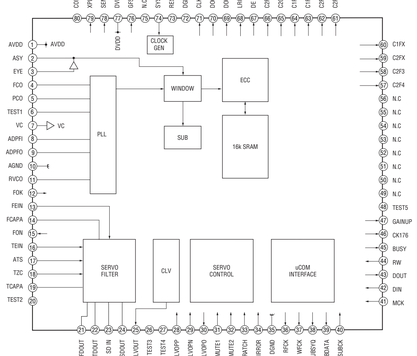
IC401 MPC18A26VMEL



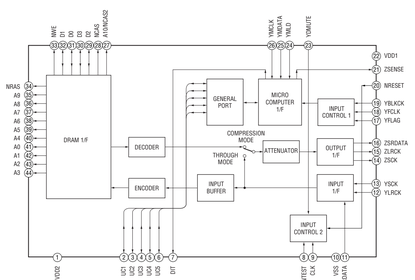
IC501 BA6386K



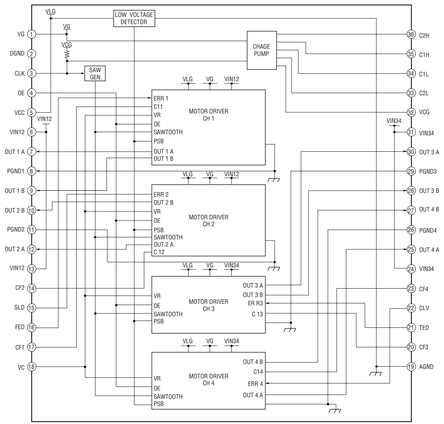
IC502 BU9326KS



IC601 SM5902AF



IC701 MPC17A51VMEL



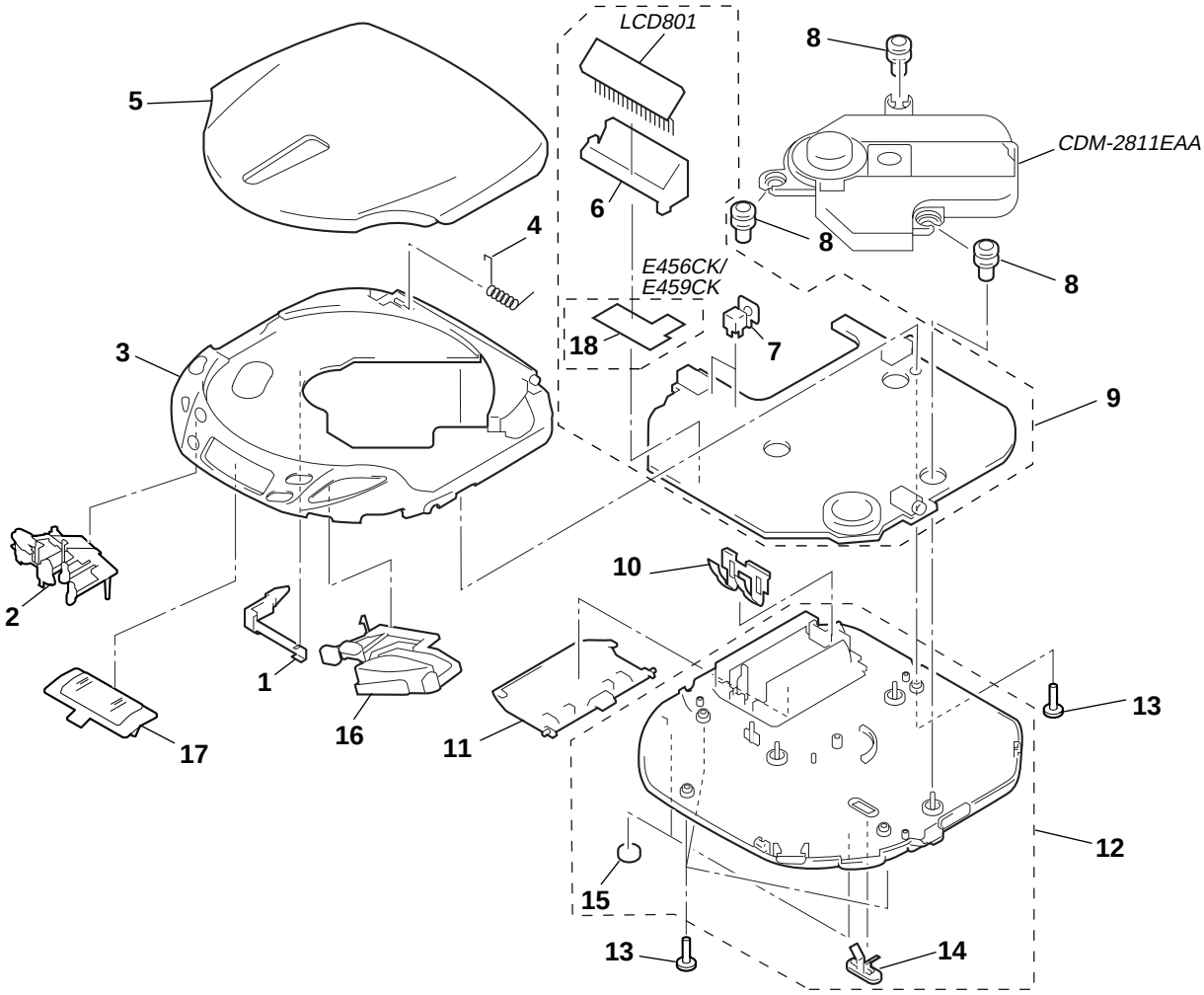
SECTION 7
EXPLODED VIEWS

NOTE :

- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Color indication of Appearance Parts
  Example :
  KNOB, BALANCE (WHITE) ••• (RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked " * "are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

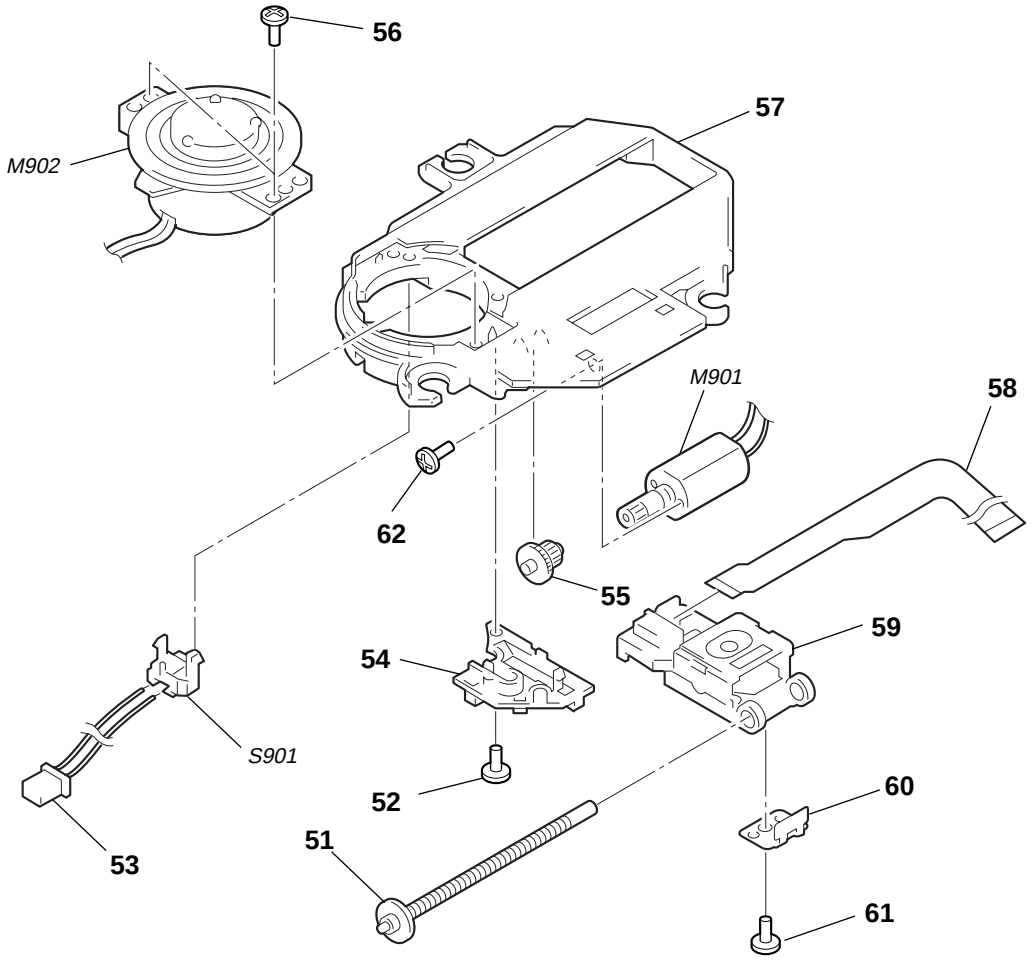
7-1. CABINET SECTION



Ref. No.	Part No.	Description	Remark
1	X-4950-224-1	DETECTOR ASSY	
2	4-213-874-01	BUTTON (OPEN)	
3	4-213-871-11	CABINET (UPPER) (BLUE) (E451)	
3	4-213-871-41	CABINET (UPPER) (SILVER)	
4	4-994-981-01	SPRING, TORSION	
5	X-4952-003-1	LID ASSY, UPPER (BLUE) (E451)	
5	X-4952-004-1	LID ASSY, UPPER (SILVER) (E451)	
5	X-4952-016-1	LID ASSY, UPPER (SILVER) (E455)	
5	X-4952-017-1	LID ASSY, UPPER (SILVER) (E459CK)	
5	X-4952-018-1	LID ASSY, UPPER (SILVER) (E456CK)	
6	4-213-876-01	HOLDER (LCD) (E451,E455)	
6	4-222-877-01	HOLDER (LCD) (E456CK, E459CK)	
7	4-978-695-01	PLATE, TERMINAL, BATTERY	
8	4-990-219-01	INSULATOR	
9	A-3323-270-A	MAIN BOARD, COMPLETE (E451)	

Ref. No.	Part No.	Description	Remark
9	A-3323-281-A	MAIN BOARD, COMPLETE (E455)	
9	A-3323-282-A	MAIN BOARD, COMPLETE (E456CK,E459CK)	
10	4-997-109-01	TERMINAL BOARD (RELAY),BATTERY	
11	4-213-873-01	LID, BATTERY CASE	
12	X-4950-730-1	CABINET (LOWER) SUB ASSY	
13	3-336-395-01	SCREW (B2X10) (G), TAPPING	
14	4-213-879-01	KNOB (AVLS)	
15	4-966-278-01	FOOT, RUBBER	
16	4-213-875-01	BUTTON (CONTROL)	
17	4-213-877-01	WINDOW (LCD)	
* 18	1-675-316-11	LED SUB BOARD (E456CK,E459CK)	
LCD801	1-803-017-11	DISPLAY PANEL, LIQUID CRYSTAL (E451, E455)	
LCD801	1-803-776-11	DISPLAY PANEL, LIQUID CRYSTAL (E456CK, E459CK)	

7-2. OPTICAL PICK-UP SECTION (CDM-2811EAA)



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
51	A-3303-970-A	SCREW ASSY, FEED	
52	3-318-203-11	SCREW (B1.7), TAPPING	
53	1-690-530-81	LEAD (WITH CONNECTOR)	
54	4-972-163-04	SPRING, SLED	
55	4-974-003-01	GEAR (B)	
56	3-719-401-11	SCREW (B1.7), TAPPING	
* 57	4-984-320-01	CHASSIS	
58	1-660-965-11	PC BOARD, SLIDE FLEXIBLE	

Ref. No.	Part No.	Description	Remark
⚠59	X-4950-476-1	OPTICAL PICK-UP (DAX-11E)	
60	4-972-165-01	RACK	
61	4-973-631-01	SCREW	
62	7-627-850-17	SCREW,PRECISION +P 1.4X2.5	
M901	A-3303-403-A	MOTOR ASSY (SLED) (INCLUDING GEAR)	
M902	A-3303-971-A	MOTOR ASSY, TURNTABLE (SPINDLE)	
S901	1-571-099-21	SWITCH (1 KEY) (LIMIT)	

SECTION 8
ELECTRICAL PARTS LIST

LED SUB **MAIN**

NOTE :

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL : Metal-film resistor
  METAL OXIDE :Metal oxide-film resistor
  F : nonflammable
- Items marked " * "are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : µ , for example :
  uA.... : µ A.... , uPA.... : µ PA....
  uPB.... : µ PB.... , uPC.... : µ PC....
  uPD.... : µ PD....
- CAPACITORS
  uF : µ F
- COILS
  uH : µ H

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description			Remark
*	1-675-316-11	LED SUB BOARD (E456CK,E459CK)			
		**********			
		< DIODE >			
D906	8-719-061-91	LED SML-210PT (LCD BACK-LIGHT)			
D907	8-719-061-91	LED SML-210PT (LCD BACK-LIGHT)			
D908	8-719-061-91	LED SML-210PT (LCD BACK-LIGHT)			
D909	8-719-061-91	LED SML-210PT (LCD BACK-LIGHT)			
D910	8-719-061-91	LED SML-210PT (LCD BACK-LIGHT)			
D911	8-719-061-91	LED SML-210PT (LCD BACK-LIGHT)			
D912	8-719-061-91	LED SML-210PT (LCD BACK-LIGHT)			
D913	8-719-061-91	LED SML-210PT (LCD BACK-LIGHT)			
		< TRANSISTOR >			
Q901	8-729-402-13	TRANSISTOR XN1501			
Q902	8-729-904-86	TRANSISTOR 2SB1197K-Q			
Q903	8-729-807-34	TRANSISTOR 2SB1123-S			
		< RESISTOR >			
R911	1-216-807-11	RES,CHIP	68	5%	1/16W
R912	1-216-807-11	RES,CHIP	68	5%	1/16W
R913	1-216-807-11	RES,CHIP	68	5%	1/16W
R914	1-216-807-11	RES,CHIP	68	5%	1/16W
R915	1-216-807-11	RES,CHIP	68	5%	1/16W
R916	1-216-827-11	RES,CHIP	3.3K	5%	1/16W
R917	1-216-817-11	RES,CHIP	470	5%	1/16W
R918	1-216-807-11	RES,CHIP	68	5%	1/16W
R919	1-216-807-11	RES,CHIP	68	5%	1/16W
R920	1-216-807-11	RES,CHIP	68	5%	1/16W
R921	1-216-864-11	RES,CHIP	0	5%	1/16W
R926	1-216-833-91	RES,CHIP	10K	5%	1/16W
R928	1-216-845-11	RES,CHIP	100K	5%	1/16W
R929	1-216-049-91	RES,CHIP	1K	5%	1/10W
**********					
	A-3323-270-A	MAIN BOARD, COMPLETE (E451)			
	A-3323-281-A	MAIN BOARD, COMPLETE (E455)			
	A-3323-282-A	MAIN BOARD, COMPLETE (E456CK,E459CK)			
		**********			
	4-213-876-01	HOLDER (LCD) (E451,E455)			
	4-222-877-01	HOLDER (LCD) (E456CK, E459CK)			
	4-978-695-01	PLATE, TERMINAL, BATTERY			

Ref. No.	Part No.	Description			Remark
		< CAPACITOR >			
C101	1-126-794-11	ELECT	4.7uF	20%	50V
C102	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C103	1-115-156-11	CERAMIC CHIP	1uF		10V
C104	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C105	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C106	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C108	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C201	1-126-794-11	ELECT	4.7uF	20%	50V
C202	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C203	1-115-156-11	CERAMIC CHIP	1uF		10V
C204	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C205	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C206	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C208	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C302	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C303	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C304	1-124-635-00	ELECT	220uF	20%	6.3V
C305	1-124-584-00	ELECT	100uF	20%	10V
C306	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C307	1-126-795-11	ELECT	10uF	20%	25V
C308	1-126-795-11	ELECT	10uF	20%	25V
C312	1-128-057-11	ELECT	330uF	20%	6.3V
C313	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C314	1-115-156-11	CERAMIC CHIP	1uF		10V
C315	1-126-514-11	ELECT	22uF	20%	10V
C316	1-216-864-11	METAL CHIP	0		
C317	1-115-156-11	CERAMIC CHIP	1uF		10V
C323	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C324	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C326	1-115-467-11	CERAMIC CHIP	0.22uF	10%	10V
C335	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C401	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C402	1-126-785-11	ELECT	47uF	20%	10V
C403	1-127-485-00	ELECT	33uF	20%	6.3V
C404	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C405	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C406	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C407	1-115-156-11	CERAMIC CHIP	1uF		10V
C408	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C410	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C411	1-164-360-11	CERAMIC CHIP	0.1uF		16V

MAIN

Ref. No.	Part No.	Description			Remark
C414	1-115-156-11	CERAMIC CHIP	1uF		10V
C415	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C417	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C420	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C421	1-124-635-00	ELECT	220uF	20%	6.3V
C424	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C425	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C426	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C427	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C428	1-164-346-11	CERAMIC CHIP	1uF		16V
C432	1-115-156-11	CERAMIC CHIP	1uF		10V
C437	1-115-156-11	CERAMIC CHIP	1uF		10V
C439	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C501	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C503	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C504	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C505	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C506	1-115-565-11	CERAMIC CHIP	2.2uF	10%	10V
C509	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C510	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C511	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C512	1-115-156-11	CERAMIC CHIP	1uF		10V
C513	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C514	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C515	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C516	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C517	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C518	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C519	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C520	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C521	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C523	1-115-565-11	CERAMIC CHIP	2.2uF	10%	10V
C525	1-110-569-11	TANTAL. CHIP	47uF	20%	4V
C526	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C528	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C529	1-126-513-11	ELECT	47uF	20%	4V
C531	1-115-565-11	CERAMIC CHIP	2.2uF	10%	10V
C532	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C534	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C535	1-115-156-11	CERAMIC CHIP	1uF		10V
C538	1-165-128-11	CERAMIC CHIP	0.22uF		16V
C539	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C540	1-107-826-91	CERAMIC CHIP	0.1uF	10%	16V
C549	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C550	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C555	1-110-569-11	TANTAL. CHIP	47uF	20%	4V
C557	1-115-156-11	CERAMIC CHIP	1uF		10V
C560	1-164-227-91	CERAMIC CHIP	0.022uF	10%	16V
C561	1-126-513-11	ELECT	47uF	20%	4V
C562	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C563	1-107-826-91	CERAMIC CHIP	0.1uF	10%	16V
C571	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C572	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C575	1-113-619-11	CERAMIC CHIP	0.47uF		10V
C587	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C588	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C598	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C599	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V

Ref. No.	Part No.	Description			Remark
C601	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C602	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C611	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C615	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C616	1-104-847-91	TANTALUM CHIP	22uF	20%	4V
C619	1-164-390-91	CERAMIC CHIP	330PF	5%	50V
C702	1-107-826-91	CERAMIC CHIP	0.1uF	10%	16V
C703	1-107-826-91	CERAMIC CHIP	0.1uF	10%	16V
C704	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C705	1-162-955-11	CERAMIC CHIP	150PF	5%	50V
C706	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C707	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C708	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C712	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C716	1-164-346-11	CERAMIC CHIP	1uF		16V
C802	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C804	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C806	1-115-156-11	CERAMIC CHIP	1uF		10V
C807	1-115-156-11	CERAMIC CHIP	1uF		10V
C808	1-115-156-11	CERAMIC CHIP	1uF		10V
C809	1-115-156-11	CERAMIC CHIP	1uF		10V
C814	1-216-864-11	METAL CHIP	0		
C879	1-115-156-11	CERAMIC CHIP	1uF		10V
C907	1-164-360-11	CERAMIC CHIP	0.1uF		16V

< CONNECTOR >

Ref. No.	Part No.	Description
CN501	1-566-530-11	CONNECTOR, FPC (ZIF) 14P
* CN701	1-695-320-51	PIN, CONNECTOR (1.5MM)(SMD) 2P
* CN702	1-695-320-31	PIN, CONNECTOR (1.5MM)(SMD) 2P
CN703	1-695-320-21	PIN, CONNECTOR (1.5MM)(SMD) 2P

< DIODE >

Ref. No.	Part No.	Description
D101	8-719-069-54	DIODE UDZS-TE17-5.1B
D105	8-719-039-99	DIODE UMZ8.2T
D201	8-719-069-54	DIODE UDZS-TE17-5.1B
D205	8-719-039-99	DIODE UMZ8.2T
D302	8-719-069-54	DIODE UDZS-TE17-5.1B
D401	8-719-048-98	DIODE RB160L-40TE25
D402	8-719-072-70	DIODE MA2ZD14001S0
D403	8-719-049-10	DIODE 1SS374-TE85L
D407	8-719-058-24	DIODE RB501V-40TE-17
D416	8-719-048-98	DIODE RB160L-40TE25
D417	8-719-017-58	DIODE MA8068
D503	8-719-059-50	DIODE MA3J142D0LSO
D801	8-719-058-24	DIODE RB501V-40TE-17
D803	8-719-069-54	DIODE UDZS-TE17-5.1B
D804	8-719-039-99	DIODE UMZ8.2T
D805	8-719-039-99	DIODE UMZ8.2T
D806	8-719-069-54	DIODE UDZS-TE17-5.1B
D807	8-719-039-99	DIODE UMZ8.2T

< FERRITE BEAD >

Ref. No.	Part No.	Description
FB101	1-500-234-22	FERRITE
FB102	1-500-234-22	FERRITE
FB201	1-500-234-22	FERRITE
FB202	1-500-234-22	FERRITE
FB301	1-500-234-22	FERRITE

Ref. No.	Part No.	Description	Remark
FB302	1-500-234-22	FERRITE	
FB303	1-216-295-00	METAL CHIP 0	
FB304	1-500-234-22	FERRITE	
FB306	1-500-234-22	FERRITE	
FB401	1-419-256-21	INDUCTOR CHIP 2.2uH	
FB402	1-419-256-21	INDUCTOR CHIP 2.2uH	
FB501	1-500-234-22	FERRITE	
FB502	1-500-234-22	FERRITE	
FB601	1-500-234-22	FERRITE	
FB603	1-216-295-00	METAL CHIP 0	
FB801	1-500-234-22	FERRITE	
FB802	1-216-864-11	METAL CHIP 0	
FB803	1-500-234-22	FERRITE	
		< IC >	
IC301	8-759-483-60	IC TC9438FNEL	
IC302	8-759-522-87	IC TA2120FN(EL)	
IC401	8-759-483-61	IC MPC18A26VMEL	
IC501	8-759-432-83	IC BA6386K	
IC502	8-759-563-54	IC BU9326KS	
IC503	8-759-528-79	IC NJU7012F-TE2	
IC505	8-759-082-60	IC TC7S66FU	
IC601	8-759-484-37	IC SM5902AF	
IC603	8-759-538-44	IC MSM51V17400D-10TK-FS	
IC701	8-759-483-62	IC MPC17A51VMEL	
IC801	8-759-639-93	IC MC68HC05L15SC442720CPB	
		< JACK >	
J301	1-778-696-11	JACK (LINE OUT)	
J302	1-580-680-11	JACK (🎧 / REMOTE)	
J401	1-778-153-21	JACK,DC(POLARITY UNIFIED TYPE)	(DC IN 4.5V)
		< JUMPER RESISTOR >	
JW304	1-216-864-11	METAL CHIP 0 5%	1/16W
JW401	1-216-296-00	METAL CHIP 0 5%	1/8W
JW501	1-216-295-00	METAL CHIP 0 5%	1/10W
JW502	1-216-295-00	METAL CHIP 0 5%	1/10W
		< COIL >	
L301	1-469-034-11	INDUCTOR 4.7uH	
L302	1-414-821-11	INDUCTOR 4.7uH	
L303	1-414-821-11	INDUCTOR 4.7uH	
L304	1-414-821-11	INDUCTOR 4.7uH	
L401	1-414-267-11	INDUCTOR 10uH	
L402	1-414-404-11	INDUCTOR 100uH	
L502	1-414-267-11	INDUCTOR 10uH	
L504	1-414-267-11	INDUCTOR 10uH	
L506	1-414-267-11	INDUCTOR 10uH	
L507	1-414-267-11	INDUCTOR 10uH	
L508	1-216-295-00	METAL CHIP 0	
L701	1-414-402-11	INDUCTOR 47uH	
L702	1-414-402-11	INDUCTOR 47uH	
L801	1-414-916-11	FERRITE 0uH	
		< LIQUID CRYSTAL DISPLAY >	
LCD801	1-803-017-11	DISPLAY PANEL, LIQUID CRYSTAL (E451, E455)	

Ref. No.	Part No.	Description	Remark
LCD801	1-803-776-11	DISPLAY PANEL, LIQUID CRYSTAL (E456CK, E459CK)	
		< TRANSISTOR >	
Q101	8-729-209-06	TRANSISTOR 2SC4213-A	
Q201	8-729-209-06	TRANSISTOR 2SC4213-A	
Q300	8-729-028-74	TRANSISTOR DTA114TUA-T106	
Q302	8-729-907-39	TRANSISTOR IMD2	
Q311	8-729-422-51	TRANSISTOR UN5110-QRS	
Q401	8-729-044-09	TRANSISTOR 2SD2153T100V	
Q402	8-729-044-10	TRANSISTOR MMBF0201NLT1	
Q404	8-729-921-93	TRANSISTOR 2SB1182F5-QR	
Q405	8-729-920-85	TRANSISTOR 2SD1664-QR	
Q501	8-729-216-22	TRANSISTOR 2SA1162-G	
Q506	8-729-029-06	TRANSISTOR DTC124EUA-T106	
Q507	8-729-028-74	TRANSISTOR DTA114TUA-T106	
Q508	8-729-028-74	TRANSISTOR DTA114TUA-T106	
Q509	8-729-420-29	TRANSISTOR 2SD1819A	
Q801	8-729-420-29	TRANSISTOR 2SD1819A	
Q802	8-729-420-29	TRANSISTOR 2SD1819A	
Q809	8-729-420-29	TRANSISTOR 2SD1819A	
		< RESISTOR >	
R101	1-216-813-11	RES,CHIP 220 5%	1/16W
R102	1-216-845-11	RES,CHIP 100K 5%	1/16W
R103	1-216-841-11	RES,CHIP 47K 5%	1/16W
R105	1-216-821-11	RES,CHIP 1K 5%	1/16W
R107	1-216-793-11	RES,CHIP 4.7 5%	1/16W
R201	1-216-813-11	RES,CHIP 220 5%	1/16W
R202	1-216-845-11	RES,CHIP 100K 5%	1/16W
R203	1-216-841-11	RES,CHIP 47K 5%	1/16W
R205	1-216-821-11	RES,CHIP 1K 5%	1/16W
R207	1-216-793-11	RES,CHIP 4.7 5%	1/16W
R304	1-216-803-11	RES,CHIP 33 5%	1/16W
R306	1-216-864-11	RES,CHIP 0 5%	1/16W
R307	1-216-821-11	RES,CHIP 1K 5%	1/16W
R308	1-216-864-11	RES,CHIP 0 5%	1/16W
R310	1-216-142-00	RES,CHIP 4.7 5%	1/8W
R312	1-216-815-11	RES,CHIP 330 5%	1/16W
R326	1-216-853-11	RES,CHIP 470K 5%	1/16W
R401	1-218-911-11	METAL CHIP 470K 0.50%	1/16W
R402	1-218-899-11	METAL CHIP 150K 0.50%	1/16W
R403	1-216-825-11	RES,CHIP 2.2K 5%	1/16W
R404	1-216-799-11	RES,CHIP 15 5%	1/16W
R406	1-216-304-11	RES,CHIP 3.3 5%	1/10W
R408	1-216-809-11	RES,CHIP 100 5%	1/16W
R409	1-216-837-11	RES,CHIP 22K 5%	1/16W
R413	1-216-845-11	RES,CHIP 100K 5%	1/16W
R414	1-216-845-11	RES,CHIP 100K 5%	1/16W
R415	1-216-815-11	RES,CHIP 330 5%	1/16W
R416	1-216-298-00	RES,CHIP 2.2 5%	1/10W
R417	1-216-298-00	RES,CHIP 2.2 5%	1/10W
R418	1-216-864-11	RES,CHIP 0 5%	1/16W
R419	1-216-849-11	RES,CHIP 220K 5%	1/16W
R421	1-216-833-91	RES,CHIP 10K 5%	1/16W
R423	1-216-853-11	RES,CHIP 470K 5%	1/16W
R429	1-218-895-11	METAL CHIP 100K 0.50%	1/16W
R430	1-218-883-11	METAL CHIP 33K 0.50%	1/16W

MAIN

Ref. No.	Part No.	Description			Remark
R431	1-216-864-11	RES,CHIP	0	5%	1/16W
R433	1-216-821-11	RES,CHIP	1K	5%	1/16W
R501	1-216-825-11	RES,CHIP	2.2K	5%	1/16W
R502	1-216-827-11	RES,CHIP	3.3K	5%	1/16W
R503	1-216-829-11	RES,CHIP	4.7K	5%	1/16W
R504	1-216-839-11	RES,CHIP	33K	5%	1/16W
R505	1-216-142-00	RES,CHIP	4.7	5%	1/8W
R506	1-216-833-91	RES,CHIP	10K	5%	1/16W
R507	1-216-829-11	RES,CHIP	4.7K	5%	1/16W
R508	1-216-833-91	RES,CHIP	10K	5%	1/16W
R509	1-216-835-11	RES,CHIP	15K	5%	1/16W
R510	1-216-829-11	RES,CHIP	4.7K	5%	1/16W
R511	1-216-833-91	RES,CHIP	10K	5%	1/16W
R512	1-216-833-91	RES,CHIP	10K	5%	1/16W
R513	1-216-829-11	RES,CHIP	4.7K	5%	1/16W
R517	1-216-838-11	RES,CHIP	27K	5%	1/16W
R518	1-216-864-11	RES,CHIP	0	5%	1/16W
R519	1-216-831-11	RES,CHIP	6.8K	5%	1/16W
R521	1-216-827-11	RES,CHIP	3.3K	5%	1/16W
R522	1-216-833-91	RES,CHIP	10K	5%	1/16W
R525	1-216-821-11	RES,CHIP	1K	5%	1/16W
R528	1-216-829-11	RES,CHIP	4.7K	5%	1/16W
R529	1-216-864-11	RES,CHIP	0	5%	1/16W
R531	1-216-833-91	RES,CHIP	10K	5%	1/16W
R533	1-216-841-11	RES,CHIP	47K	5%	1/16W
R534	1-216-833-91	RES,CHIP	10K	5%	1/16W
R535	1-216-829-11	RES,CHIP	4.7K	5%	1/16W
R538	1-216-833-91	RES,CHIP	10K	5%	1/16W
R539	1-216-864-11	RES,CHIP	0	5%	1/16W
R542	1-216-851-11	RES,CHIP	330K	5%	1/16W
R543	1-216-864-11	RES,CHIP	0	5%	1/16W
R544	1-216-849-11	RES,CHIP	220K	5%	1/16W
R545	1-216-849-11	RES,CHIP	220K	5%	1/16W
R546	1-216-825-11	RES,CHIP	2.2K	5%	1/16W
R547	1-216-843-11	RES,CHIP	68K	5%	1/16W
R548	1-216-825-11	RES,CHIP	2.2K	5%	1/16W
R549	1-216-833-91	RES,CHIP	10K	5%	1/16W
R550	1-216-864-11	RES,CHIP	0	5%	1/16W
R555	1-216-845-11	RES,CHIP	100K	5%	1/16W
R563	1-216-845-11	RES,CHIP	100K	5%	1/16W
R569	1-216-843-11	RES,CHIP	68K	5%	1/16W
R570	1-216-841-11	RES,CHIP	47K	5%	1/16W
R599	1-216-851-11	RES,CHIP	330K	5%	1/16W
R602	1-216-833-91	RES,CHIP	10K	5%	1/16W
R610	1-216-864-11	RES,CHIP	0	5%	1/16W
R611	1-216-821-11	RES,CHIP	1K	5%	1/16W
R612	1-216-821-11	RES,CHIP	1K	5%	1/16W
R613	1-216-821-11	RES,CHIP	1K	5%	1/16W
R614	1-216-821-11	RES,CHIP	1K	5%	1/16W
R630	1-216-864-11	RES,CHIP	0	5%	1/16W
R632	1-216-864-11	RES,CHIP	0	5%	1/16W
R701	1-216-864-11	RES,CHIP	0	5%	1/16W
R702	1-216-825-11	RES,CHIP	2.2K	5%	1/16W
R802	1-216-833-91	RES,CHIP	10K	5%	1/16W
R803	1-216-821-11	RES,CHIP	1K	5%	1/16W
R804	1-216-853-11	RES,CHIP	470K	5%	1/16W
R805	1-216-861-11	RES,CHIP	2.2M	5%	1/16W
R806	1-216-821-11	RES,CHIP	1K	5%	1/16W
R807	1-216-821-11	RES,CHIP	1K	5%	1/16W
R808	1-216-851-11	RES,CHIP	330K	5%	1/16W
R810	1-216-857-11	RES,CHIP	1M	5%	1/16W
R811	1-216-857-11	RES,CHIP	1M	5%	1/16W
R813	1-216-833-91	RES,CHIP	10K	5%	1/16W
R817	1-216-821-11	RES,CHIP	1K	5%	1/16W
R818	1-216-857-11	RES,CHIP	1M	5%	1/16W
R819	1-216-821-11	RES,CHIP	1K	5%	1/16W
R820	1-216-831-11	RES,CHIP	6.8K	5%	1/16W
R821	1-216-829-11	RES,CHIP	4.7K	5%	1/16W
R822	1-216-827-11	RES,CHIP	3.3K	5%	1/16W
R823	1-216-825-11	RES,CHIP	2.2K	5%	1/16W
R824	1-216-823-11	RES,CHIP	1.5K	5%	1/16W
R825	1-216-821-11	RES,CHIP	1K	5%	1/16W
R826	1-216-821-11	RES,CHIP	1K	5%	1/16W
R829	1-216-864-11	RES,CHIP	0	5%	1/16W
R830	1-216-864-11	RES,CHIP	0	5%	1/16W
R879	1-216-857-11	RES,CHIP	1M	5%	1/16W

< VARIABLE RESISTOR >

RV301	1-223-609-21	RES, VAR, CARBON 10K/10K (◢ VOLUME)
RV502	1-223-587-11	RES, ADJ, CARBON 22K (TRACKING GAIN)
RV503	1-223-587-11	RES, ADJ, CARBON 22K (FOCUS GAIN)

< SWITCH >

S301	1-762-078-11	SWITCH, SLIDE (AVLS)
S801	1-762-822-11	SWITCH, PUSH (1 KEY) (OPEN SW)
S802	1-571-754-31	SWITCH, PUSH (1 KEY) (RECHG BAT DET)
S803	1-762-078-11	SWITCH, SLIDE (RESUME)
S804	1-762-078-11	SWITCH, SLIDE (HOLD ▬◣)
S805	1-571-760-11	SWITCH, KEYBOARD (PLAY MODE)
S806	1-571-760-11	SWITCH, KEYBOARD (ESP)
S808	1-571-760-11	SWITCH, KEYBOARD (■)
S809	1-571-760-11	SWITCH, KEYBOARD (REPEAT/ENTER)
S810	1-571-760-11	SWITCH, KEYBOARD (I◀◀)
S811	1-571-760-11	SWITCH, KEYBOARD (▶▶I)
S812	1-571-760-11	SWITCH, KEYBOARD (▶II)
S813	1-554-088-00	SWITCH, KEY BOARD (SOUND)

< TRANSFORMER >

T401	1-475-573-11	TRANSFORMER, DC-DC CONVERTER

< VIBRATOR >

X301	1-760-307-11	VIBRATOR, CERAMIC (16.9MHz)
X801	1-577-101-11	VIBRATOR, CERAMIC (4.1943MHz)

****

MISCELLANEOUS

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53	1-690-530-81	LEAD (WITH CONNECTOR)
58	1-660-965-11	PC BOARD, SLIDE FLEXIBLE
⚠59	X-4950-476-1	OPTICAL PICK-UP (DAX-11E)
LCD801	1-803-017-11	DISPLAY PANEL, LIQUID CRYSTAL (E451, E455)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
LCD801	1-803-776-11	DISPLAY PANEL, LIQUID CRYSTAL (E456CK, E459CK)	
M901	A-3303-403-A	MOTOR ASSY (SLED) (INCLUDING GEAR)	
M902	A-3303-971-A	MOTOR ASSY, TURNTABLE (SPINDLE)	
S901	1-571-099-21	SWITCH (1 KEY) (LIMIT)	

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ACCESSORIES & PACKING MATERIALS
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	1-251-696-11	CONNECTING PACK, CAR (E456CK,E459CK)	
⚠	1-467-009-21	ADAPTOR, AC (AC-E455)	
	1-475-603-11	REMOTE CONTROL UNIT (E455,E459CK)	
	1-528-444-74	BATTERY PACK (BP-DM10) (E455,E459CK)	
⚠	1-532-433-11	FUSE, GLASS TUBE (1A) (E456CK,E459CK)	
⚠	1-533-689-11	FUSE, GLASS CYLINDRICAL(DIA.5) (1A) (E456CK,E459CK)	
	1-784-619-11	CORD DCC-E2455//M SET (E456CK,E459CK)	
	1-784-619-11	CORD, CAR BATTERY (E459CK)	
	3-856-479-21	MANUAL, INSTRUCTION (ENGLISH) (E456CK,E459CK)	
	3-867-525-11	MANUAL, INSTRUCTION (ENGLISH)	
	8-953-276-90	HEADPHONE MDR-24SP SET (E455,E459CK)	
	8-953-342-93	HEADPHONE MDR-24/1 SET (E451,E456CK)	

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Replace only with part number specified.

9-927-136-11

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